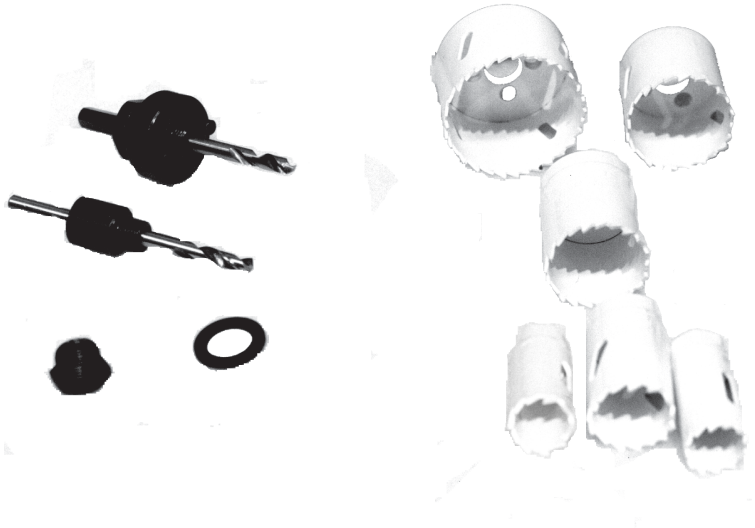
DRILL MASTER®

BI-METAL HOLE SAWS

FOR ELECTRICIANS (MODEL 93420)
FOR PLUMBERS (MODEL 93421)
9 PCS. IN EACH SET

Model 93420 93421

ASSEMBLY & OPERATING INSTRUCTIONS



Due to continuing improvements, actual product may differ slightly from the product described therein.

Distributed Exclusively by HARBOR FREIGHT TOOLS®

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For technical questions and replacement parts please call 1-800-444-3353.

THANK YOU for choosing a **HARBOR FREIGHT TOOLS** product. For future reference, please complete the owner's record below:

Model_____ **Serial No.**_____ **Purchase Date**_____

SAVE THE RECEIPT, WARRANTY AND THESE INSTRUCTIONS. It is important that you read the entire manual to become familiar with the unit BEFORE you begin assembly.

Technical Specifications

The M3 High speed steel cutting edge is electronic beam welded to an alloy steel body for tougher and longer lasting teeth. Alternate tooth set for smoother and faster cuts with better chip clearance. The bi-metal construction provides durability and long life. Heat vents for cooler running.
135 degree split point Pilot bit for better penetration and to prevent skating.

Each kit contains 6 Hole Saws, 2 Pilot Bits, 2 Mandrels and a Mandrel Adapter. For Hole Saw sizes see the listing on page 4.

Maximum RPM: Maximum drill speeds for various types of material - see chart on page 6.

IMPORTANT SAFETY INSTRUCTIONS!

READ ALL INSTRUCTIONS BEFORE USING THIS PRODUCT!

Safety Warnings and Precautions

WARNING: When using product, basic safety precautions should always be followed to reduce the risk of personal injury and damage to equipment.

Read all instructions before using this product!

1. **Keep work area clean**. Cluttered areas invite injuries.
2. **Observe work area conditions**. Keep work area well lighted.
3. **Store idle equipment**. When not in use, the Hole Saws must be stored in a safe and clean location. Always lock up products and keep out of reach of children.
4. **Use the right product for the job**. There are certain applications for which the Hole Saws were designed. Do not modify the Hole Saws and do not use the Hole Saws for a purpose for which they were not intended.
5. **Check for damaged parts**. Before using any product, any part that appears damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for any broken or damaged parts and any other conditions that may affect its operation. Replace or repair damaged or worn parts immediately.
6. **Replacement parts and accessories**. When servicing, use only identical replacement parts. Use of any other parts will void the warranty.
7. **Do not operate product if under the influence of alcohol or drugs**. Read warning labels on prescriptions to determine if your judgment or reflexes are impaired while taking drugs. If there is any doubt, do not operate the product.

8. **Use eye and ear protection**. Always wear ANSI approved impact safety goggles. Wear a full face shield if you are producing metal filings and wood chips. Wear an ANSI approved dust mask or respirator when working around metal, wood, and chemical dusts and mists.

9. **Do not overreach**. Keep proper footing and balance at all times. Do not reach over or across running machines.

10. **Maintain tools with care**. Keep tools sharp and clean for better and safer performance. Follow instructions for lubricating and changing accessories. Inspect tool cords periodically and, if damaged, have them repaired by an authorized technician. Inspect all components of the Bi-Metal Hole Saw for damage. Never use a damaged or cracked drill bit, hole saw blade or mandrel.

11. **Always check hardware and assembled parts after assembling.** All connections should be tight and hardware tightened.

12. **Do not force this product.** Do not use inappropriate attachments in an attempt to exceed the Hole Saw's capacity.

13. **Keep children away.** Children must never be allowed in the work area.

14. **Read the instruction manual provided by your drill's manufacturer and adhere to all warnings and instructions.**

15. **Before each use check to see that the drill bit is tightly mounted to the Mandrel.** The Mandrel's screw tip should be in contact with the step flat portion of the bit before tightening the screw.

Warning: The warnings, cautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

WARNING: Some dust created by power sanding, sawing, grinding, drilling, and other construction activities, contain chemicals known [to the State of California] to cause cancer, birth defects or other reproductive harm. Examples are: A) Lead from lead-based paints, B) Crystalline silica from bricks and cement or other masonry products, C) Arsenic and chromium from chemically treated lumber. (California Health & Safety Code § 25249.5, *et seq.*)

Unpacking

When unpacking your Bi-Metal Hole Saws, make certain that all parts on page 5 of this manual are included. If any parts are missing or broken, please call **HARBOR FREIGHT TOOLS** at **1-800-444-3353.**

Assembly and Operation

Your 9 PC Bi-Metal Hole Saw will require some easy assembly. It is important that you read the entire manual to become familiar with the product BEFORE you assemble and use the Hole Saws. Wearing work gloves are recommended when assembling this product.

Electrician's Hole Saw (93420)

Hole Saw sizes 2-1/2", 2", 1-3/4" and 1-3/8" can be used with either the 1/4" Mandrel or the 7/16" Mandrel. The Mandrel you choose to use will depend on the size of the Pilot Bit desired.

Decide on the Hole Saw size to be used-refer to the Parts List on page 5.

Using the 7/16” Mandrel with 2-1/2”, 2”, 1-3/4”, 1-3/8”

1. Thread the Hole Saw onto the end of the Mandrel.
2. Slide the Pin Connecting Ring up so that the Guiding Pins fit into two of the holes on the base of the Hole Saw-see Figure 1 A.

93420-Using the 7/16” Mandrel (Cont’d)

3. Thread the nut up (toward the bit) to tighten the Pin Connecting Ring against the Hole Saw.

93420-Using the 1/4” Mandrel with 2-1/2”, 2”, 1-3/4”, 1-3/8”

1. Thread the Mandrel Adapter (11) down onto the Mandrel.
2. Slide on the Mandrel Ring (13). Thread on the Hole Saw-see Figure 1 B.

93420-Using the 1/4” Mandrel with 1-1/8” and 7/8”

The 1-1/8” Hole Saw and the 7/8” Hole Saw can only be used with the 1/4” Mandrel.

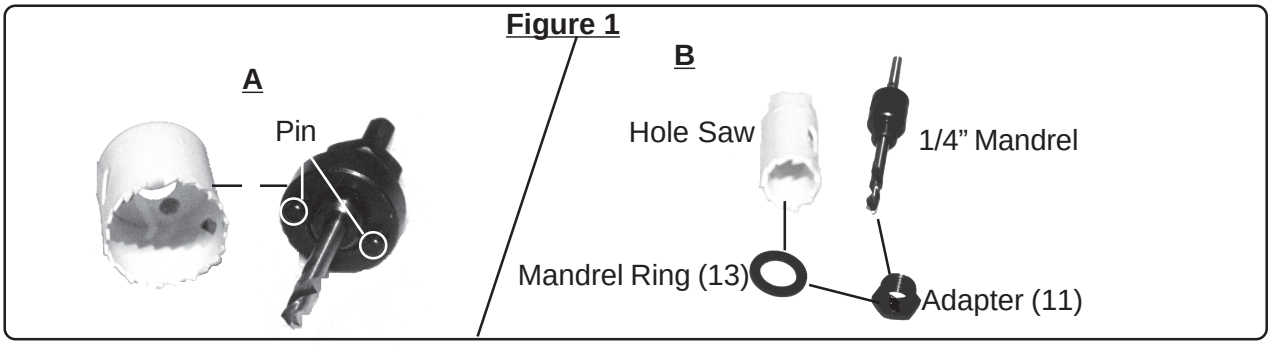
1. Thread the Hole Saw down onto the Mandrel.

Mounting to the Drill

1. After attaching the Hole Saw to the desired Mandrel, the Hole Saw is now ready to be mounted to the drill. Read the drill owner’s manual for instructions on properly mounting drill bits.

2. Before using the Hole Saw, make certain that the work piece is firmly clamped in place. Mark the center of the hole to be drilled using a centerpunch. Place the drill bit in the centerpunch impression, and slowly begin drilling into the workpiece. Always hold the drill firmly with both hands to ensure safe operation of the Hole Saw.

Figure 1



Plumbers Hole Saw (93421)

Hole Saw sizes 2-1/4”, 1-3/4” and 1-1/2” can be used with either the 1/4” Mandrel or the 7/16” Mandrel. The Mandrel you choose to use will depend on the size of the Pilot Bit desired.

Decide on the Hole Saw size to be used-refer to the Parts List on page 5.

93421-Using the 7/16” Mandrel with 2-1/4”,1-3/4”, 1-1/2”

1. Thread the Hole Saw onto the end of the Mandrel.

2. Slide the Pin Connecting Ring up so that the Guiding Pins fit into two of the holes on the base of the Hole Saw-see Figure 1 A.

3. Thread the nut up (toward the bit) to tighten the Pin Connecting Ring against the Hole Saw.

93421-Using the 1/4” Mandrel with 2-1/4”,1-3/4”, 1-1/2”

1. Thread the Mandrel Adapter (11) down onto the Mandrel.

2. Slide on the Mandrel Ring (13). Thread on the Hole Saw-see Figure 1 B.

93421-Using the 1/4” Mandrel with 1-1/8”, 7/8” and 3/4”

The 1-1/8” Hole Saw, the 7/8” and the 3/4” can only be used with the 1/4” Mandrel.

1. Thread the Hole Saw down onto the Mandrel.

Mounting to the Drill

1. After attaching the Hole Saw to the desired Mandrel, the Hole Saw is now ready to be mounted to the drill. Read the drill owner’s manual for instructions on properly mounting drill bits.

2. Before using the Hole Saw, make certain that the work piece is firmly clamped in place. Mark the center of the hole to be drilled using a centerpunch. Place the drill bit in the centerpunch impression, and slowly begin drilling into the workpiece. Always hold the drill firmly with both hands to ensure safe operation of the Hole Saw.

Maintenance

1. Check the Hole Saw and Mandrel before each use. Make certain that the Hole Saw is tightly in place and that no part is worn or damaged.

2. Clean the Metal Hole Saws after each use. Remove any debris, grease, oil and dirt.

3. Store in the Blow Mold Case in a secure place out of the reach of children.

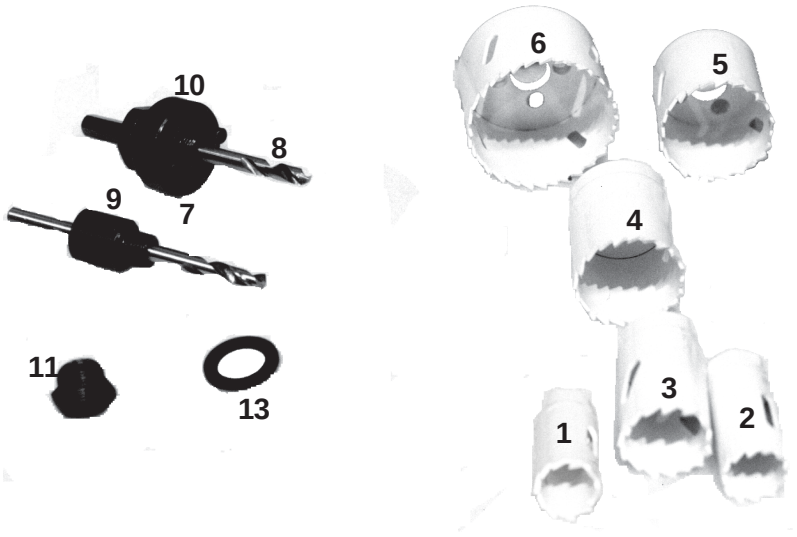
Parts List-93420-Electrician

Part #	Description	Quantity	Part #	Description	Quantity
1	Saw 7/8”D x 2”H	1	8	Pilot Bit-1-7/8” L x 1/4”	1
2	Saw 1-1/8”D x 2” H	1	9	Mandrel-1/4”	1
3	Saw-1-3/8” D x 2” H	1	10	Mandrel-7/16”	1
4	Saw-1-3/4”Dx1-3/4”H	1	11	Mandrel Adapter	1
5	Saw-2”D x 1-3/4” H	1	12	Blow Mold Case	1
6	Saw 2-1/2”Dx1-3/4”H	1	13	Mandrel Ring	1
7	Pilot Bit-2-1/8”Lx1/4”D	1			

Parts List-93421-Plumber

Part #	Description	Quantity	Part #	Description	Quantity
1	Saw 3/4” D x 2” H	1	8	Pilot Bit-1-7/8” L x 1/4”	1
2	Saw 7/8” D x 2” H	1	9	Mandrel-1/4”	1
3	Saw-1-1/8” D x 2” H	1	10	Mandrel-7/16’	1
4	Saw-1-1/2”Dx1-3/4”H	1	11	Mandrel Adapter	1
5	Saw-1-3/4” Dx1-3/4”H	1	12	Blow Mold Case	1
6	Saw 2-1/4” x 1-3/4” H	1	13	Mandrel Ring	1

Parts Diagram



#12-Blow Mold Case not shown

Note: Some parts are listed and shown for illustration purposes only and are not available individually as replacement parts.

PLEASE READ THE FOLLOWING CAREFULLY

THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THE PARTS DIAGRAM IN THIS MANUAL AS A REFERENCE TOOL ONLY. NEITHER THE MANUFACTURER NOR DISTRIBUTOR MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND TO THE BUYER THAT HE OR SHE IS QUALIFIED TO MAKE ANY REPAIRS TO THE PRODUCT OR THAT HE OR SHE IS QUALIFIED TO REPLACE ANY PARTS OF THE PRODUCT. IN FACT, THE MANUFACTURER AND/OR DISTRIBUTOR EXPRESSLY STATES THAT ALL REPAIRS AND PARTS REPLACEMENTS SHOULD BE UNDERTAKEN BY CERTIFIED AND LICENSED TECHNICIANS AND NOT BY THE BUYER. THE BUYER ASSUMES ALL RISK AND LIABILITY ARISING OUT OF HIS OR HER REPAIRS TO THE ORIGINAL PRODUCT OR REPLACEMENT PARTS THERETO, OR ARISING OUT OF HIS OR HER INSTALLATION OF REPLACEMENT PARTS THERETO.

Figure 2-Maximum RPMs

Size	Mild Steel	Stainless Steel	Cast Iron	Brass	Aluminum
3/4”	460	230	300	600	690
7/8”	390	195	260	520	585
1-1/8”	325	155	205	415	465
1-3/8”	285	145	190	380	425
1-1/2”	230	115	150	300	345
1-3/4”	195	95	130	250	295
2”	170	85	115	230	255
2-1/4	150	75	100	200	225
2-1/2”	135	65	90	180	205